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Baker Project

Oregon: Baker and Union Counties

Pacific Northwest Region
Bureau of Reclamation

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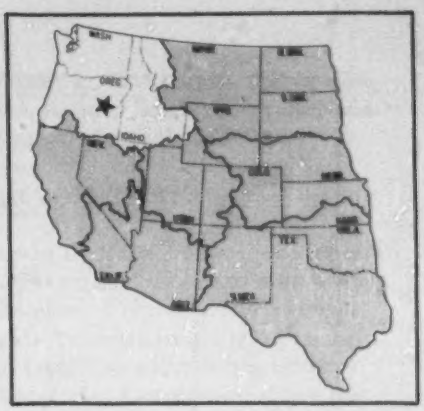

The Baker Project in east-central Oregon consists of two divisions, the Lower and the Upper. The Lower Division provides a supplemental water supply for about 7,300 acres along the Powder River about 10 miles northeast of Baker, Oreg. The Upper Division provides supplemental water for 19,000 acres, including some contiguous areas previously dry-farmed near the city of Baker.

PLAN

Lower Division

The irrigation supply for the Lower Division is stored by Thief Valley Dam, on the Powder River 16 miles north of Baker. Water from the reservoir is released into the river channel, from which it is diverted into the various canals of the district, some 8 miles downstream from the dam. All carriage and distribution facilities were privately constructed.

Thief Valley Dam is a reinforced concrete, slab and buttress (Ambursen) structure, 73 feet high and 390 feet long. Thief Valley Reservoir has a capacity of 17,600 acre-feet of water, and covers an area of 740 acres.

Upper Division

Facilities of the Upper Division furnish supplemental irrigation water to lands on both sides of the Powder River in Baker County, encompassing an area 7 miles wide and 16 miles long adjacent to and north of the city of Baker. Benefits include flood control, fish and wildlife, and recreation. Major features include Mason Dam, Phillips Lake, Lilley Pumping Plant, Lilley Relift Pumping Plant, and recreation facilities.

Mason Dam is a rolled-earth and rockfill structure 173 feet in height with a crest length of 895 feet. Phillips Lake, impounded behind the dam. covers 2,235 acres and has an active capacity of 90,500 acre-feet of water.

The main Lilley Pumping Plant, consisting of four vertical-shaft turbine-type pumps with a total capacity of 68 cubic feet per second, serves 3,450 acres with water.

The Lilley Relift Plant has three vertical-shaft mixed-flow pumps totaling 34 cubic feet per second and capable of serving 670 acres.

DEVELOPMENT

Early History

The discovery of gold in Sumpter Valley in 1861 brought the first settlement of the area. Baker Valley attracted some of the homeseekers following the Oregon Trail toward western Oregon. Baker, situated where the old trail entered the valley, was first settled in 1863. Mining attracted many of the pioneers, but stockraising and farming were undertaken by others. Irrigation began in the 1870's, when farmers seeking to improve the native hay meadows made simple diversions from the streams. Construction of a railroad through Baker Valley in 1884 encouraged expansion of the livestock and lumbering industries.

Mason Dam

Region Revision 5/82
(From Project Data Book)

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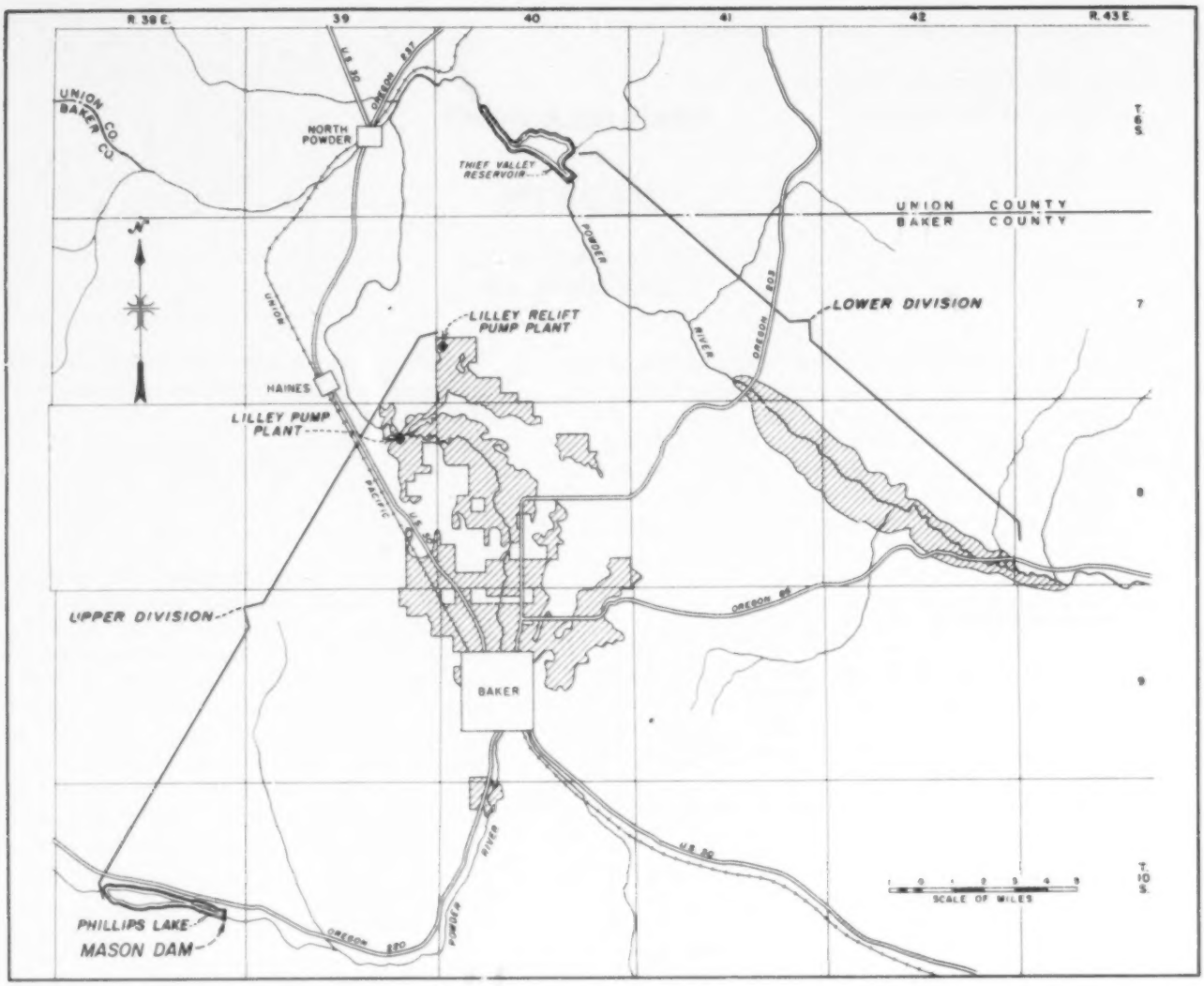


Baker Project

Investigations

The Lower Division of the Baker Project was first initiated as a Carey Act project by the Powder Valley Irrigation Company about 1909. After an inactive period of about 10 years, the Baker County Chamber of Commerce and a New York corporation sought the assistance of the Reclamation Service for investigations and studies. In 1921, the Director of Reclamation recommended that investigations of the Baker Project be undertaken. Surveys were begun in September 1921, resulting in a recommendation of the Thief Valley site for construction of a dam. The first phase of the project was approved in 1931.

The Upper Division had been under study since about 1930, with local interest and support continuing throughout the entire period. The present development of approximately 19,000 acres evolved from an earlier plan that contemplated a valley-wide irrigation district. This development, through storage of surplus flows, enhances and stabilizes the water supply for the lands in the Baker Valley Irrigation District, and provides the basis for and does not preclude future ultimate resource development of the basin.

Authorization

The Lower Division of the Baker Project was approved by the President on March 18, 1931. The Upper Division was approved by an act of Congress on September 27, 1962, (76 Stat. 634, Public Law 87-706).

Construction

Construction of the Thief Valley Dam of the Lower Division was started September 12, 1931, and completed on

May 6, 1932. Construction of Upper Division facilities started in 1965 and was completed in 1968.

Operating Agencies

The Lower Division is operated by the Lower Powder River Irrigation District and the Upper Division by the Baker Valley Irrigation District.

BENEFITS

Irrigation

Principal crops produced on both divisions are grain, alfalfa hay, grass hay, pasture, and some seed.

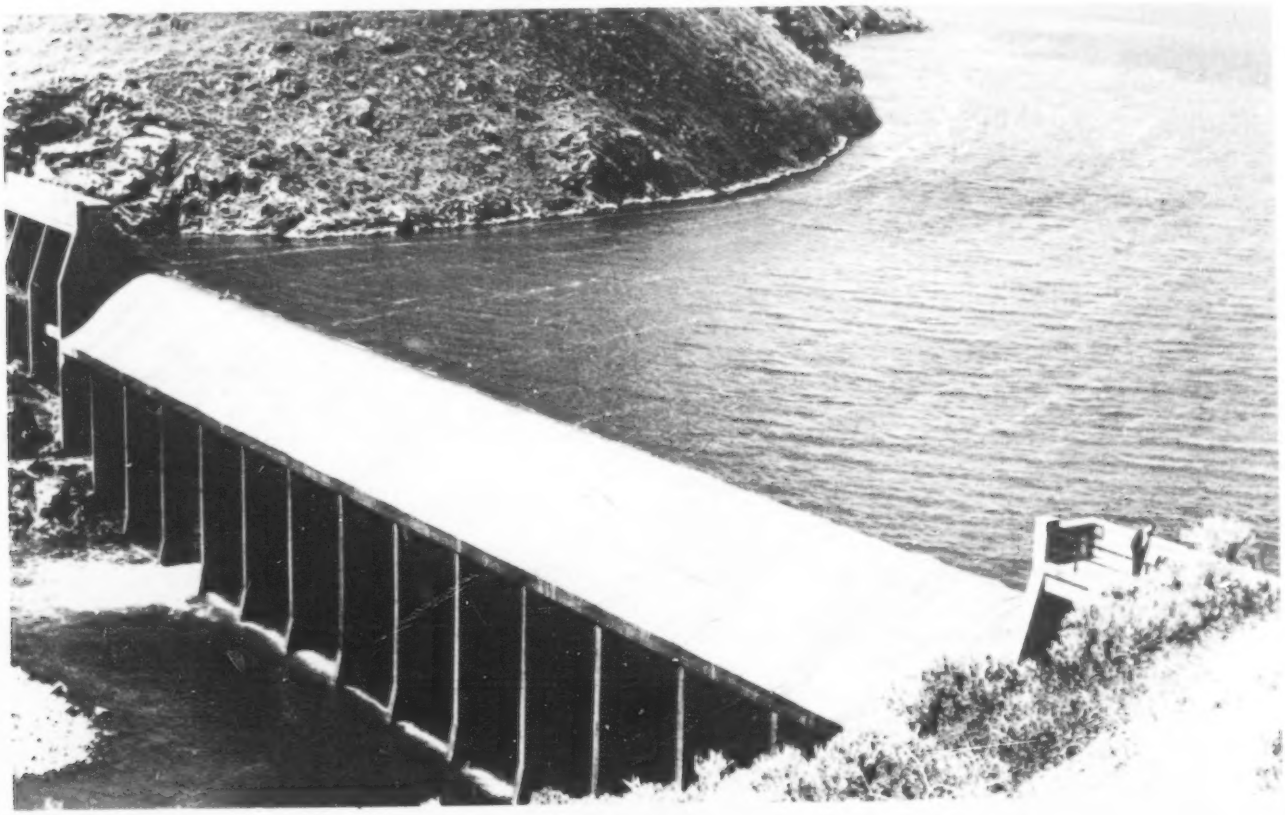
Flood Control

Nearly every year normal high water causes damage by inundation of some farm land in the Baker Valley. Less frequent but higher floodflows have caused considerable damage in the past to residential, municipal, and commercial property. Except for some of the lower-lying farm land, flood regulation is being accomplished through the use of 17,000 acre-feet of space in Phillips Lake assigned exclusively to flood control, and an additional 21,000 acre-feet assigned jointly to irrigation and flood control on a forecast of runoff basis.

Recreation and Fish and Wildlife

Most of the 909 acres of the Thief Valley Reservoir area are inundated, with 740 acres of water surface providing about 10 miles of shoreline. A portion of the reservoir area has been set aside for recreational use. Camping, picnicking, and boat launching and mooring facilities have been constructed. Union County administers this site. The reservoir has developed a reputation for excellent fishing for trout, largemouth bass, and black crappie which have been planted in the reservoir. Large numbers of waterfowl use the reservoir, and ducks have established nests.

A total of 5,038 acres in the Phillips Lake area is available for recreational use. There are 2,235 acres of water surface and a shoreline stretching almost 13 miles. Recreation facilities for camping, picnicking, swimming, and boat launching and mooring have been constructed and are administered by the Forest Service. The reservoir is stocked annually with several species of trout. Many waterfowl rest at the reservoir during migration, especially Canada geese.



Thief Valley Dam

PROJECT DATA

Land Areas (1980)

Irrigable area (Lower Divison):		
Supplemental irrigation service	7,281	acres
Irrigable area (Upper Division):		
Supplemental irrigation service	19,000	acres
Total	26,281	acres

Area Irrigated and Crop Value

Year	Area irrigated, acres	Crop value, dollars
1968	7,230	389,720
1969	23,260	1,614,092
1970	24,056	1,491,880
1971	23,958	2,161,038
1972	24,046	2,103,028
1973	24,216	3,141,615
1974	24,761	3,712,105
1975	25,258	3,763,377
1976	24,302	4,401,352
1977	24,454	3,114,420
1978	24,440	2,789,774
1979	24,360	4,002,496
1980	24,637	4,607,536

Climatic Conditions (1966-80)

Annual precipitation	10.9	in
Temperature:		
Maximum	102	°F
Minimum	—39	°F
Mean	46	°F
Growing season	139	days
Elevation of irrigable area	3300-3470.0	ft

ENGINEERING DATA

Water Supply

POWDER RIVER

Drainage area at North Powder Gage 2 mi above Thief Valley Dam	910	mi²
Annual discharge[1]		
Maximum (1971)	269,700	acre-ft
Minimum (1977)	37,000	acre-ft
Average	168,700	acre-ft
Drainage area above Mason Dam	170	mi²
Annual discharge (1966-80):		
Maximum (1974)	170,400	acre-ft
Minimum (1977)	16,500	acre-ft
Average	84,100	acre-ft

[1]Discharge affected by regulated storage at Phillips Lake and diversions for irrigation.

Storage Facilities

THIEF VALLEY DAM

Type: Concrete slab and buttress
Location: On the Powder River 16 mi north of Baker, Oreg.
Construction period: 1931-32
Date of first storage: April 2, 1932

Reservoir, Thief Valley:		
Total capacity to El. 3133	17,600	acre-ft
Active capacity to El. 3133	17,400	acre-ft
Surface area	740	acres
Dimensions:		
Structural height	73	ft
Hydraulic height	48	ft
Top width	7	ft
Maximum base width	85	ft
Crest length	390	ft
Crest elevation	3143.0	ft
Volume	6,300	yd³

Spillway: Uncontrolled overflow section in dam.

Crest length	268	ft
Crest elevation	3133.0	ft
Capacity at El. 3143	35,000	ft³/s

Outlet works: Two openings through face of dam in overflow section, controlled by two 4.8- by 6-ft slide gates.

Capacity at El. 3143	2,440	ft³/s

Foundation: Quartzite overlain in the abutments with seamy fractured lava-rock. A 6-ft-wide fault zone near right abutment dips 50° toward left abutment and strikes nearly parallel with stream channel.
Special treatment: Grout curtain beneath upstream cutoff trench and grouting of springs in fault.

MASON DAM

Type: Rolled earth and rockfill
Location: On the Powder River 11 mi southwest of Baker, Oreg.
Construction period: 1965-68
Date of first storage: Nov. 3, 1967

Reservoir, Phillips Lake:		
Total capacity to El. 4070.5	95,500	acre-ft
Active capacity to El. 4070.5	90,500	acre-ft
Surface area	2,235	acres
Dimensions:		
Structural height	173	ft
Hydraulic height	144	ft
Top width	35	ft
Maximum base width	875	ft
Crest length	895	ft
Crest elevation	4082.0	ft
Volume	894,794	yd³

Spillway: Reinforced concrete chute, 20 ft wide from ogee crest at El. 4070.5 to reinforced concrete stilling pool at base of dam.

Capacity at El. 4070.5	1,210	ft³/s

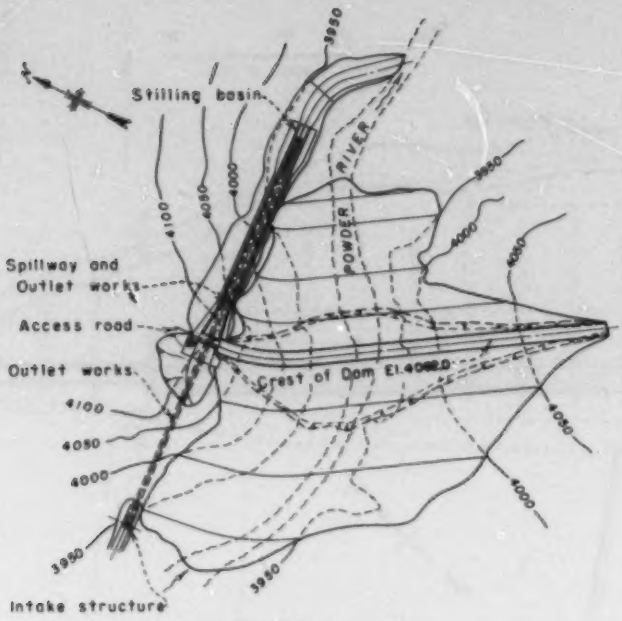
Outlet works: Controlled by two 2.75-ft pressure gates in the 56-in-diameter wyed steel outlet pipe, discharging into the downstream stilling pool.

Capacity at El. 4070.5	875	ft³/s

Carriage Facilities

PUMPING PLANTS

Designation	Unit number	Total capacity, ft³/s	Total dynamic head, ft	Total horsepower
Lilley Pumping Plant	1	22.28	101	350
	2	7.35	101	125
	3	15.60	101	250
	4	22.28	101	350
Lilley Relift Pumping Plant	1	9.80	35	60
	2	19.60	35	125
	3	4.90	35	30



GENERAL PLAN

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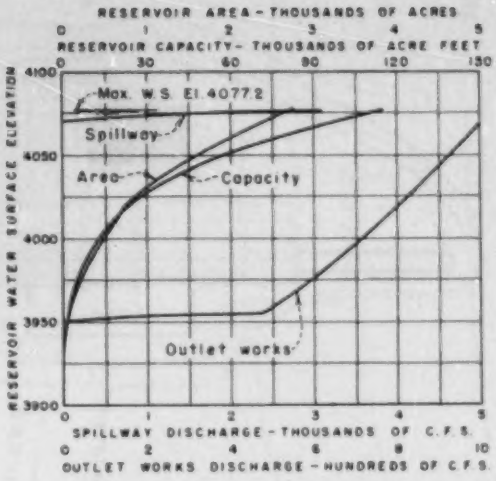
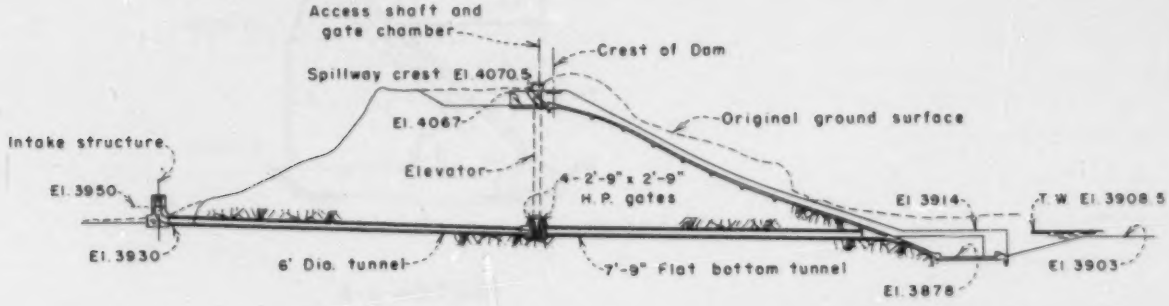
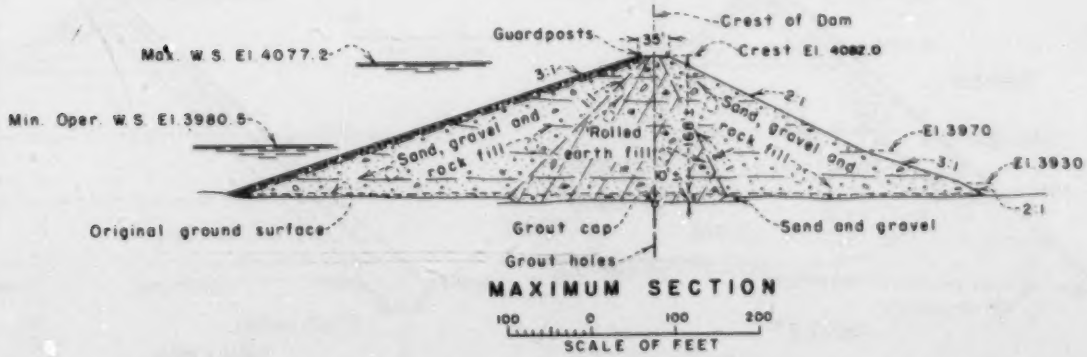
SCALE OF FEET



AREA - CAPACITY - DISCHARGE CURVES



PROFILE ON ℄ SPILLWAY AND OUTLET WORKS



MAXIMUM SECTION

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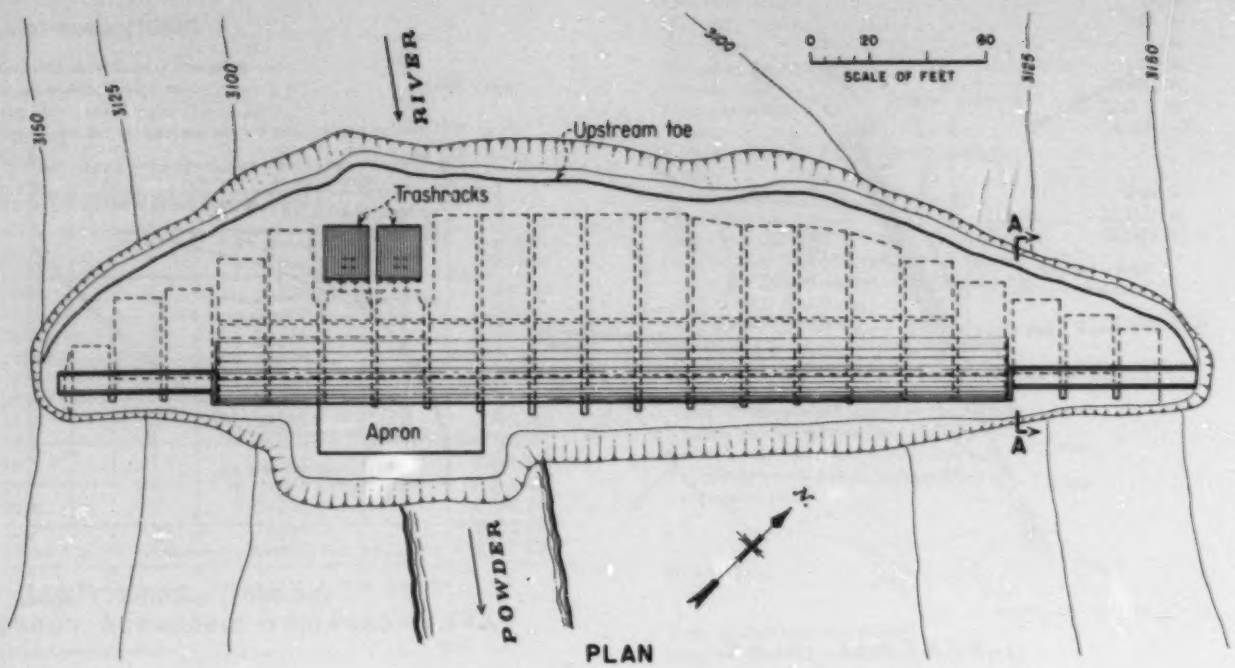
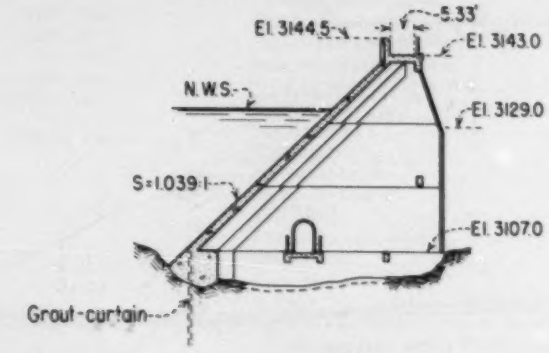
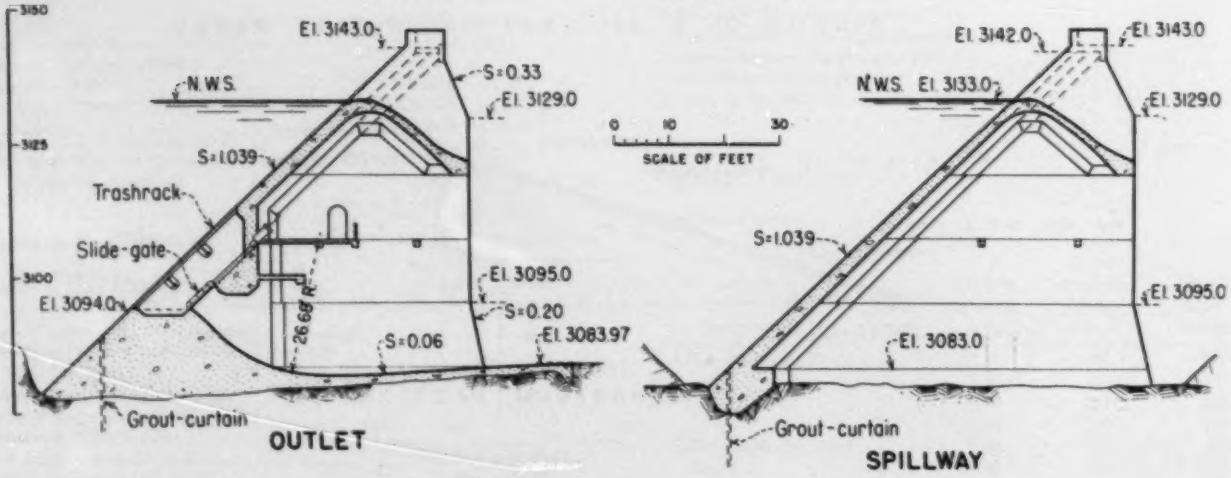
SCALE OF FEET

Mason Dam, Plan and Sections







Thief Valley Dam, Plan and Sections

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